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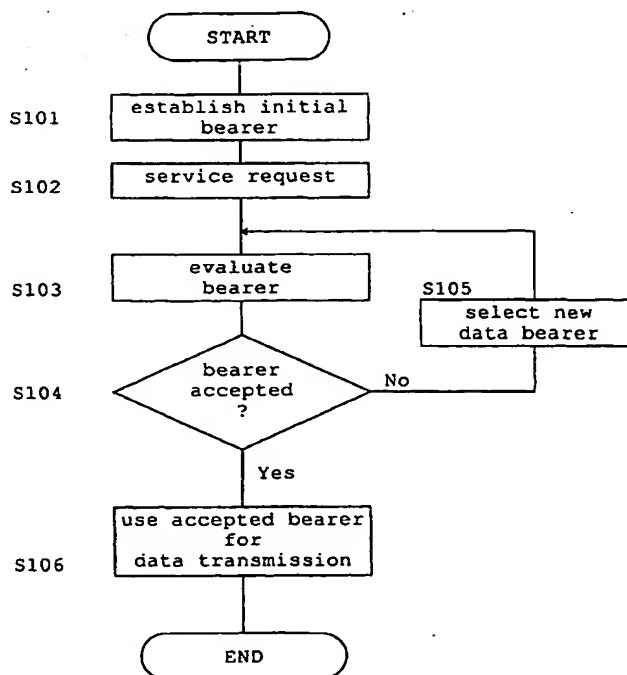
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(54) Title: DATA TRANSMISSION METHOD AND NETWORK SYSTEM



(57) Abstract: The present invention relates to a data transmission method and network system, in which a data bearer to be used for supplying data is judged, and the data bearer is rejected or accepted in response to the judging result. Furthermore, a new data bearer may be selected and judged. The judging may be performed on the basis of a communication with the end-user or solely at the network side based on predetermined bearer selection parameters.

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The evaluation of the data bearer may be performed at a data bearer selection point (10) which may be provided as a separate network element. Thus, an optimal data bearer can be selected on the basis of the preferences of a requested service, a network operator, and/or a subscriber, under consideration of a network condition and the capabilities of the end terminal to which the data bearer is to be established. Thereby, a capacity optimization can be achieved.

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**Data Transmission Method and Network System**FIELD OF THE INVENTION

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The present invention relates to a data transmission method and network system for supplying data, such as a multimedia message or a content from an origin server, to an end terminal.

10

BACKGROUND OF THE INVENTION

In the next few years, multimedia applications will in full scale enter the world of cellular communications. To support new services, which will set new demands on the infrastructure for radio communications, a new wireless communication system needs to be developed. To meet these demands of wireless mobile communication in a true multimedia environment, high-speed packet data and Internet content bearer services play major roles.

The future of mobile telephony is now being determined by the global standardization work conducted by public authorities and the industry. Wireless Application Environment (WAE) is a result of the Wireless Application Protocol (WAP) efforts to promote industry-wide standards and specifications for developing applications and services that operate over wireless communication networks. WAE specifies an application frame work for wireless devices such as mobile telephones, pagers and PDAs (Personal Digital Assistants). The frame work extends and leverages other WAP technologies as well as other Internet technologies such as scripting and various content formats. The effort is aimed at enabling operators, manufacturers and content developers to meet the challenges of

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implementing advanced differentiating services and applications in a fast and flexible manner.

WAE adopts a model that closely follows the WWW (World Wide Web) model. All content is specified in formats that are similar to the standard Internet formats. The content is transported using standard protocols in the WWW domain and an optimized protocol similar to HTTP (Hyper Text Transfer Protocol) in the wireless domain. The WAE architecture allows all content and services to be hosted on standard Web origin servers. All content is located using WWW standard URLs (Uniform Resource Locators).

WAE enhances some of the WWW standards in ways that reflect the device and network characteristics. WAE extensions are added to support mobile network services such as call control and messaging. Careful attention is paid to the memory and CPU processing constraints that are found in mobile terminals. Support for low bandwidth and high latency networks is included in the architecture as well. WAE assumes the existence of a gateway functionality responsible for encoding and decoding data transferred from and to the mobile client. The purpose of encoding content delivered to the client is to minimize the size of data sent to the client over-the-air as well as to minimize the computational energy required by the client to process that data. The gateway functionality can be added to origin servers or placed in dedicated gateways.

In the mobile stations of the mobile network, a software or device, called user agent, is provided that interprets a network content referenced by a URL. This may include textual browsers, voice browsers, search engines and the like.

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The user agent is connected to the mobile network using dedicated signalling connections. The origin server communicates with the client using the WAP protocol stack, may be connected to the mobile network, and is responsible for deploying content to its clients. In the case of call-handling, for example, the mobile network sets up the call to the client, the server delivers the event-handling content, and the user agent invokes the event-handler content and manages the presentation of the call-handling service to the user.

Moreover, in recent years, multimedia telephone terminals which can be connected to fixed networks have been developed. The terminals provide real-time video, audio, or data or any combination thereof, between two multimedia telephone terminals over a voiceband network connection. Communication may be either one-way or two-way. The multimedia telephone terminals can be integrated in PCs or workstations, or can be stand-alone units.

Interworking between PLMNs (Public Land Mobile Networks) and PSTNs (Public Switched Telephone Networks) is currently being specified in third generation mobile systems. Interworking with visual telephone systems or mobile radio networks is defined in the ITU-T video/multimedia recommendation H.324/M. In particular, different types of connections (or bearers) may be used to transmit a multimedia call via the mobile network. The call may be established as a HSCSD (High Speed Circuit Switched Data) call, a modem call or a UDI (Unrestricted Digital Information) call, or other connection or bearer types.

However, in case a content or multimedia message is retrieved by a user, the price, speed and preferences of the user are usually not taken into account during the

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downloading procedure. Furthermore, most end-users probably cannot or do not care about changing the bearer in mobile menus provided at the mobile terminal.

- 5 On the other hand, the network operator probably would like to control the use of bearer in order to utilize the network capacity in the best way. Moreover, in WAP or other Internet applications, the requirements for an optimal bearer may depend on the application.

10

#### SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a data transmission method and network system for  
15 providing a data content to an end terminal, by means of which the use of an optimal bearer for the data can be assured.

This object is achieved by a data transmission method for  
20 supplying data via a network system, the method comprising the steps of:

- establishing a connection using an initial data bearer;  
requesting a service for providing the data;  
selecting a preferred data bearer to be used for supplying  
25 the data;  
judging the selected data bearer to be used; and  
rejecting or accepting the data bearer in response to the judging result of the judging step.

- 30 Furthermore, the above object is achieved by a network system for supplying data based on a service request from an end terminal, the network system comprising:  
bearer judging means for judging a data bearer to be used for supplying the data; and

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bearer selecting means for establishing the connection using the data bearer in response to the judging result of the judging means.

5 Additionally, the above object is achieved by a network element for a network system for supplying data based on a service request from an end terminal, the network element comprising:

10 bearer evaluating means for evaluating the bearer to be used for supplying the data;  
bearer selecting means for selecting a new data bearer based on predetermined bearer selection parameters.

15 Accordingly, a judgment of the data bearer to be used for supplying the data is performed, which may be based on a communication between the end-user and the network system, or which may be based on a network judgement performed by the network system. Thereby, a specific information relating to the data or message can be presented to the  
20 user for reference, such that the user may decide on the use of the bearer or the supplying of the data based on the specific information.

25 Furthermore, the network operator may affect the effectivity of the use of the network capacity based on its own preferences by using e.g. a bearer usage information in order to derive bearer-specific network capacity requirements. Thus, the responsibility about the data bearer selection is moved more to the operator. This may  
30 lead to a better usage of the network system, since the operator is the only party who really knows the network resources provided by the network system.

In particular, a new data bearer may be selected and a  
35 change to the new data bearer may be suggested by the

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network system. The new data bearer may be selected based on terminal capabilities at a receiving end. The suggestion of the bearer change may be based on a desired downloading speed and/or coverage restrictions. Thereby, the end  
5 terminal may be advised to switch to a less/more expensive bearer depending on the speed at which the user wishes to download the data, or any coverage restrictions such as moving out of the coverage area of a current bearer. The judging may be performed by adding a charge information to  
10 a notification of the data, wherein the data bearer may be judged at a receiving end based on the charge information. In particular, the charge information may comprise the message size and the cost for downloading the message or the cost per unit of data transferred. The charge  
15 information may be embodied in a header of the message. Thus, the user is presented with the message size for reference and a direct presentation of costs. Based on this information, the user may decide to accept or reject the data or message intended to be supplied. Hence, a capacity  
20 optimization can be performed if the terminal has the capability to change to a more optimized bearer based on e.g. the charge information provided. The data is then supplied using the data bearer if the data bearer is not rejected by the user.

25

Alternatively, the judging step may comprise acquiring a network information and judging the data bearer based on predetermined bearer selection parameters and the required network information. In particular, the network information  
30 may indicate a network load on different data bearers, and the predetermined bearer selection parameters may indicate a subscription type of an end-user, preferences of the service and/or preferences of the operator about bearers. Then, a change of the data bearer may be suggested, if the  
35 network information or the predetermined bearer selection



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parameters change. Thereby, a change of the data bearer may be initiated by the network operator to thereby enhance the effectivity of the usage of the network capacity.

- 5 The judging means and bearer selecting means may be arranged at a separate network element, such as a data bearer selection point, or may be arranged at a switching network element, or the like. Alternatively, the judging means may be arranged at the end terminal, and the bearer  
10 selecting means may be arranged in one of the above network elements.

The bearer selecting means may be arranged to select a new data bearer and to suggest a change to the new bearer to  
15 the end terminal. Preferably, the end terminal may be a mobile station of a cellular network. The data bearer may be a CSD bearer, GPRS bearer, USSD bearer, an SMS bearer, a multimedia bearer, an UDI bearer or a modem bearer.

- 20 Furthermore, the bearer evaluating means of the network element may be arranged to add a charge information to the data and to initiate a bearer change based on a response received from the end terminal. Furthermore, the bearer evaluating means may be arranged to acquire a network  
25 information, which may indicate a network load on different data bearers, and to evaluate the data bearer based on the predetermined bearer selection parameters and the acquired network information. The network elements may comprise a memory for storing the predetermined bearer selection  
30 parameters.

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BRIEF DESCRIPTION OF THE DRAWINGS

5 In the following, the present invention will be described  
in greater detail on the basis of a preferred embodiment  
with reference to the accompanying drawings in which:

Fig. 1 shows a basic block diagram of a network system for  
supplying a data to an end terminal, according to the  
10 preferred embodiment of the present invention;

Fig. 2 shows a basic flow diagram of a data transmission  
method according to the preferred embodiment of the present  
invention; and

15

Fig. 3 shows a basic block diagram of a network element  
used in the network system according to the present  
invention.

20

DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment of the present invention will now  
be described on the basis of a data transmission via a  
network system comprising a radio access network, e.g. a  
25 GSM (Global System for Mobile communication) or UMTS  
(Universal Mobile Telecommunications System) network, to a  
mobile terminal.

According to Fig. 1, a mobile station (MS) 1 which may  
30 comprise a user agent for WAP applications is connected via  
an air interface to a Base Transceiver Station (BTS) 21 of  
Base Station Subsystem (BSS) 2 of the radio access network.  
The user agent may be any browser software or device that  
interprets a content submitted from a WTA server or any  
35 origin server of the Internet 4 connected via a WAP gateway

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15. As an example, a user of such a WAP-compliant mobile telephone requests content using a specific URL input at a corresponding MMI (Man Machine Interface). The received content relating to the specific URL is then displayed at a display of the MMI.

Furthermore, the mobile network comprises a Mobile Switching Center (MSC) 3 arranged to perform all switching functions for mobile stations located in a geographical area designated as an MSC area. The MSC 3 takes into account the impact of the allocation of radio resources and mobile nature of the subscribers and has to perform, for example, procedures required for the location registration and procedures required for hand-over of respective mobile stations. The MSC 3 is connected to the BSS 2, which is a sub-system of base station equipment, such as the BTSs 21 and a Base Station Controller (BSC) 22 controlling the BTSs 22, and the like, viewed by the MSC 3 through a single interface.

The MSC 3 may be connected via different paths to the WAP gateway 15 comprising a functionality responsible for encoding and decoding data transferred from and to a mobile client, such as the MS 1. The purpose of encoding the content delivered to the client is to minimize the size of data sent to the client over the air interface as well as to minimize the computational energy required by the client to process the data. The WAP gateway 15 provides a connection to an origin server of a fixed network such as the Internet 4. The origin server responds to a content request from a user agent with the requested data expressed in one of the standard formats known to the user agent, e.g. HTML.

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According to the network system shown in Fig. 1, content data may be transmitted from the origin server via the WAP gateway 15, the MSC 3 and the BSS 2 to the MS 1 via a circuit switched data network (CSD) 13 by using a circuit switched data bearer (CSD bearer) or a high speed CSD bearer (HSCSD bearer).

In addition thereto, an USSD (Unstructured Supplementary Service Data) node or USSD center (USSDC) 9 which is connected between the MSC 3 and the WAP gateway 15 is provided in the mobile network, the USSDC 9 enables a communication of data messages, i.e. unstructured data, between the MS 1 and an origin server via the WAP gateway 15. In particular, there may be two ways of connecting the USSDC 9 to the mobile network.

First, as shown in Fig. 1, the USSDC 9 may be connected to the MSC 3 via a Home Location Register (HLR) 8 which is a data base in charge of the management of mobile subscribers. All subscription data are stored there, such as an International Mobile Subscriber Identity (IMSI) and a location information (VLR number) of each MS in order to be able to route calls to the mobile subscribers managed by the HLR 8. A mobile initiated USSD message is then routed to the HLR 8 via an additional Visitor Location Register (VLR) used for controlling MSs roaming in the MSC area of the MSC 3. The VLR is a data base containing information needed to handle the calls set up or received by the MSs registered therein. Thus, the USSD message takes the following path:  
MS 1 → BTS 21 → BSC 22 → MSC 3 → HLR 8 → USSDC 9 → WAP gateway 15. A network initiated USSD message takes the opposite path.

Second, the USSDC 9 may be connected to the GSM network directly via the MSC 3. However, in this case, only a

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mobile initiated USSD is possible. The USSD message is then rooted via the following path: MS 1 → BTS 21 → BSC 22 → MSC 3 → USSDC 9 → WAP gateway 15.

5 Thus, a USSD bearer can be used as a transparent pipe through the GSM network. In particular, the USSD bearer can be used by operators to provide operator-specific services using a similar transport mechanism as when standard GSM supplementary services are used.

10

In a similar manner, a GSM short message service (SMS) can be used to provide an additional data bearer to the WAP gateway 15 in order to access an origin server. In GSM SMS, the user data field may comprise just the short message  
15 itself or a header in addition to the short message. In this case, the data message is rooted via a respective SMS center SMSC 7 (which may be located at the MSC 3) to the WAP gateway 15.

20 As a further alternative, a data message can be transmitted via a GPRS (General Packet Radio Services) network, comprising an SGSN (Serving GPRS Support Node) 11 and a GGSN (Gateway GPRS Support Node, not shown either) 12, by using a GPRS bearer. The data message may then be supplied  
25 from an origin server of the Internet 4 via the WAP gateway 15 to a Multimedia Switching Center (MMSC) 14 which is arranged to route the data message to the GGSN 12. Then, the data message is routed via the SGSN 11 and the BSS to the MS 1.

30

It is to be noted that the content may as well be retrieved from a WTA server which is an example origin or gateway server that responds to requests from a WAP client, e.g. the MS 1, directly. The WTA server is used to provide WAP  
35 access to features of the wireless network providers

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telecommunications infrastructure. In contrast thereto, the WAP gateway 15 translates WAP requests to WWW requests thereby allowing the WAP client to submit requests to an any origin server of the Internet 4. The WAP gateway 15  
5 encodes the responses from an origin server into the compact binary format understood by the client.

Hence, according to Fig. 1, a content information may be retrieved from an Internet server by using several optional  
10 bearers or routes, e.g. via the USSDC 9, the SMSC 7, the CSD 13 or the MMSC 14.

In addition to the above-described content retrieval operations, a multimedia terminal equipment may be  
15 connected via another fixed network such as a PSTN or the like to the MS 1 of the mobile network. At the MSC 3, an interworking unit function (IWF) is provided for adapting protocol features used in the mobile network to protocol features used in the PSTN. The MSC 3 and the IWF may be  
20 arranged in a single network element, as shown in Fig. 1.

When the mobile network, e.g. the MSC 3, detects a call request for a multimedia call, a negotiation processing is performed so as to establish a desired bearer or connection  
25 type to transmit the multimedia call or message. In particular, the negotiation processing may be ITU-T V.8, V.8bis or V.140 procedure, or the like. Based on this negotiation procedure, a connection via a modem bearer or a UDI bearer, or any other kind of multimedia bearer such as  
30 a HSCSD bearer may be established by the IWF.

Accordingly, a plurality of data bearers for supplying multimedia messages or calls and for delivering content information from respective origin servers are provided in  
35 the network system shown in Fig. 1.

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According to the preferred embodiment, a data bearer selection point (DBSP) 10 is provided for selecting a suitable one of the above or other data bearers. The DBSP 10 may be arranged as a separate network element, or may be incorporated in a network element of the network system. The DBSP 10 reads a required information relating user, service, operator, or network preferences from a data base 103 connected thereto or incorporated therein.

10

In the following, a data bearer selection operation which may be performed in the DBSP 10 or the MSC 3 is described with reference to the flow diagram shown in Fig. 2.

According to Fig. 2, an initial data bearer is established in step S101. Then, a request for a service, such as an establishment of a multimedia call or a delivery of a content information, is issued by the MS 1 or another end terminal of the network system (step S102). Based on the requested service, a data bearer to be used for supplying the respective data is evaluated in step S103.

Then, the acceptance of the data bearer evaluated in step S103 is checked in step S104. If the data bearer is accepted, it is used for performing the data transmission relating to the requested service (step S106). If the data bearer is not accepted in step S104, a new data bearer may be selected (step S105), or, as an alternative, the supply of the data (establishment of the multimedia call, or delivery of the content information) may be rejected, or the initial data bearer may be used, if applicable.

The evaluation or judgment of the data bearer in step S103 may solely be performed in the DBSP 10 of the network system, or may be based on a communication between the DBSP 10 and the MS 1. In the first case, the judgment may be

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based on a network information, e.g. an information about the network load on the above different data bearers, acquired by the DBSP 10. When a new Web or WAP session is created, or a multimedia call is established, the DBSP 10  
5 defines data bearers for the session. The selection of the data bearer may then be effected by different load values in various network components, derived from the acquired network information, under consideration of predetermined data bearer selection parameters, such as subscription type  
10 of the specific end-user of the MS 1, preferences of the WAP or Web service and own preferences of network operator about data bearers. Thereby, the network load and the preferences of the end-user, the service provider and the network operator can be considered in the DBSP 10 in order  
15 to provide an optimal data bearer.

In the above second case, where the evaluation of the bearer in step S103 is based on a communication with the MS 1, the user at the MS 1 may be presented with a specific  
20 information, such as a charge information, when the provision of the requested service (establishment of the multimedia call, or delivery of a content information) is notified. Then, the DBSP 10 waits for a response, e.g. message accepted or rejected, before using the data bearer  
25 for data transmission. Based on the response received from the MS 1, the DBSP 10 or the MSC 3 initiates or rejects the data transmission. Optionally, the DBSP 10 may select a new data bearer and may supply a corresponding notification and charge information to the MS 1.

30

The charge information may comprise the message size, e.g. 50 kb, and the cost for downloading the message, or the message size, the cost per unit of data transferred (i.e. an unit could be the whole message, or a number of  
35 kilobytes/megabytes), wherein the cost for downloading the



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message may be estimated on the basis of the current network bearer speed.

As an optional feature, a bearer change may be suggested  
5 based on the terminal capabilities at the MS 1. For example, the MS 1 may currently be connected via a CSD data bearer, and the DBSP 10 or the MSC 3 may provide an advice that the MS 1 should switch to a less/more expensive bearer depending on the speed at which the user wishes to receive  
10 the data (download the message), or any coverage restrictions (e.g. the MS 1 is moving out of a GPRS to a CSD coverage area). The terminal capabilities may relate to the support of protocol features required for establishing a specific data bearer.

15 The charge information supplied to the MS 1 together with the notification of the requested service may be embodied in the message header or a subject line of the message.

20 Fig. 3 shows a basic block diagram of the DBSP 10.

According to Fig. 3, the DBSP 10 comprises a bearer evaluation unit 101 arranged to transmit/receive information to/from the HLR 8 (connection not shown) or the  
25 MSC 3. The bearer evaluation unit 101 is arranged to acquire a network information such as the network load on specific data bearers via the MSC 3. Furthermore, the bearer evaluation unit 101 may request a subscriber specific information from the HLR 8. The subscriber  
30 specific information may relate to the terminal capabilities of the subscribers mobile terminal, a subscription type of the subscriber or any other subscriber information suitable for selecting a corresponding data bearer. Moreover, the bearer evaluation unit 101 may be  
35 arranged to receive a service specific information such as

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preferences of the service, and an operator-specific information, such as preferences of the network operator about the available data bearers, from the network system. The above-described network-, subscriber-, service-, and operator-specific information is stored in a bearer data memory or data base 103 incorporated in the DBSP 10 or arranged as a separate entity (as shown in Fig. 1).

When the request of a specific service is determined by the bearer evaluation unit 101, e.g. based on an information received from MSC 3, the bearer evaluation unit 101 controls a bearer selection unit 102 so as to read the bearer data memory 103 and to select a suitable data bearer based on the terminal capabilities and preferences of the subscriber or the service provider. Then, the bearer evaluation unit 101 evaluates or judges the selected data bearer based on the above-described communication with the MS 1 of the subscriber, when the message size and charge information is available from the service provider, or evaluates or judges the selected data bearer based on the network information (e.g. network load) and the preferences of the network operator.

Based on the above evaluation or judgment, the bearer evaluation unit 101 performs a signalling to the MSC 3 so as to establish the selected data bearer, or to release the connection.

Accordingly, the above-described preferred embodiment enables the selection of an optimal data bearer based on the preferences of the network operator, the subscriber and the service provider under consideration of the current network situation and the terminal capabilities.

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It is to be noted, that the present invention may be applied in any telecommunication network or network system in which a selection between a plurality of data bearers is possible. Furthermore, the discrete hardware blocks shown  
5 in Fig. 3 may be provided by corresponding program routines controlling a processing unit (e.g. CPU) arranged in the DBSP 10 or the MSC 3. The preferred embodiment of the invention may thus vary within the scope of the attached claims.

10

In summary, the present invention relates to a data transmission method and network system, in which a data bearer to be used for supplying data is judged, and the data bearer is rejected or accepted in response to the  
15 judging result. Furthermore, a new data bearer may be selected and judged. The judging may be performed on the basis of a communication with the end-user or solely at the network side based on predetermined bearer selection parameters. The evaluation of the data bearer may be  
20 performed at a data bearer selection point which may be provided as a separate network element. Thus, an optimal data bearer can be selected on the basis of the preferences of a requested service, a network operator, and/or a subscriber, under consideration of a network condition and  
25 the capabilities of the end terminal to which the data bearer is to be established. Thereby, a capacity optimization can be achieved.

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### Claims

1. A data transmission method for supplying data via a  
5 network system, said method comprising the steps of:
  - a) establishing a connection using an initial data bearer;
  - b) requesting a service for providing said data;
  - c) selecting a preferred data bearer to be used for  
10 supplying said data;
  - d) judging said selected data bearer to be used; and
  - e) rejecting or accepting said data bearer in response to the judging result of said judging step.
- 15 2. A method according to claim 1, further comprising the steps of selecting a new data bearer and suggesting a change to said new data bearer.
3. A method according to claim 2, wherein said new data  
20 bearer is selected based on terminal capabilities at a receiving end.
4. A method according to claim 3, wherein said bearer change is suggested based on a desired downloading speed  
25 and/or coverage restrictions.
5. A method according to any one of the preceding claims, wherein said judging step comprises adding a charge information to a notification of said data, and judging  
30 said selected data bearer based on said charge information at a receiving end.
6. A method according to claim 5, wherein said charge information comprises a message size and the cost for  
35 downloading the message.

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7. A method according to claim 5, wherein said charge information comprises a message size and a cost per unit of data transferred.

5

8. A method according to any one of claims 5 to 7, wherein said charge information is embedded in a header of said message.

10 9. A method according to any one of the preceding claims, wherein said data is supplied using said selected data bearer if said data bearer is accepted.

15 10. A method according to claim 1, wherein said judging step comprises acquiring a network information and judging said selected data bearer based on predetermined bearer selection parameters and said acquired network information.

20 11. A method according to claim 10, wherein said network information indicates a network load on different data bearers.

25 12. A method according to claim 10 or 11, wherein said predetermined bearer selection parameters indicate a subscription type of an end-user, preferences of the service, and/or preferences of the network operator about bearers.

30 13. A method according to any one of claims 10 to 12, wherein a change of said selected data bearer is suggested, if said network information or said predetermined bearer selection parameters change.

35 14. A method according to any one of the preceding claims, wherein said data is a multimedia message.

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15. A method according to any one of the preceding claims, wherein said service is a Web service.

5 16. A network system for supplying data based on a service request from an end terminal (1), said network system comprising:

- a) bearer judging means (1, 10) for judging a data bearer to be used for supplying said data; and
- 10 b) bearer selecting means (10) for establishing a connection using said data bearer in response to the judging result of said judging means (1, 10).

17. A network system according to claim 16, wherein said  
15 bearer selecting means (10) is arranged to select a new data bearer and to suggest a change to said new data bearer to said end terminal (1).

18. A network system according to claim 17, wherein said  
20 bearer selecting means (10) is arranged to select said new data bearer based on terminal capabilities of said end terminal (1).

19. A network system according to claim 17 or 18, wherein  
25 said bearer selecting means (10) is arranged to suggest said bearer change based on a desired downloading speed and/or coverage restrictions.

20. A network system according to any one of claims 16 to  
30 19, wherein said judging means is arranged at said end terminal (1) and adapted to judge said data bearer based on a charge information added to said data .

21. A network system according to any one of claims 16 to  
35 19, wherein said judging means (10) is a network element

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arranged to acquire a network information and to judge said data bearer based on predetermined bearer selection parameters and said acquired network information.

5 22. A network system according to claim 21, wherein said network information indicates a network load on different data bearers.

10 23. A network system according to claim 21 or 22, wherein said predetermined bearer selection parameters indicate a subscription type of said end terminal (1), preferences of the service and/or preferences of the network operator about bearers.

15 24. A network system according to any one of claims 21 to 23, wherein said judging means (10) is arranged to suggest a change of said data bearer, if said network information or said predetermined bearer selection parameters change.

20 25. A network system according to any one of claims 21 to 24, wherein said judging means is arranged at a switching center (3) of a cellular network.

25 26. A network system according to any one of claims 16 to 25, wherein said end terminal is a mobile station (1).

27. A network system according to any one of claims 16 to 26, wherein said data bearer is a CSD bearer, a GPRS bearer, a USSD bearer, a SMS bearer, a multimedia bearer, a  
30 UDI bearer, or a modem bearer.

28. A network element for a network system for supplying data based on a service request to an end terminal (1), said network element comprising:

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- a) bearer evaluating means (101) for evaluating a bearer to be used for supplying said data; and
- b) bearer selecting means (102) for selecting a new data bearer based on predetermined bearer selection parameters.

5

29. A network element according to claim 28, wherein said predetermined bearer selection parameters indicate a subscriber type of an end-user, preferences of the service and/or preferences of the operator about bearers.

10

30. A network element according to claim 28 or 29, wherein said bearer evaluating means (101) is arranged to add a charge information to said data and to initiate a bearer change based on a response received from the end terminal

15

(1).

31. A network element according to claim 28 or 29, wherein said bearer evaluating means (101) is arranged to acquire a network information and to evaluate said data bearer based on said predetermined bearer selection parameters and said acquired network information.

20

32. A network element according to claim 31, wherein said network information indicates a network load on different data bearers.

25

33. A network element according to any one of claims 28 to 32, further comprising a memory (103) for storing said predetermined bearer selection parameters.



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**AMENDED CLAIMS**

[received by the International Bureau on 7 March 2001 (07.03.01);  
original claims 1-33 replaced by new claims 1-27 (5 pages)]

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1. A data transmission method for supplying data via a network system, said method comprising the steps of:

- 15 a) establishing a connection using an initial data bearer;
- b) requesting a service for providing said data;
- c) selecting a preferred data bearer to be used for supplying said data;
- 20 d) judging said selected data bearer to be used; and
- e) rejecting or accepting said data bearer in response to the judging result of said judging step, wherein said judging step comprises acquiring a network information and judging said selected data bearer based on predetermined
- 25 bearer selection parameters and said acquired network information, and wherein said network information indicates a network load on different data bearers.

2. A method according to claim 1, further comprising

30 the steps of selecting a new data bearer and suggesting a change to said new data bearer.

3. A method according to claim 2, wherein said new data bearer is selected based on terminal capabilities at a

35 receiving end.

4. A method according to claim 3, wherein said bearer change is suggested based on a desired downloading speed and/or coverage restrictions.

5        5. A method according to any one of the preceding claims, wherein said judging step comprises adding a charge information to a notification of said data, and judging said selected data bearer based on said charge information at a receiving end.

10

6. A method according to claim 5, wherein said charge information comprises a message size and the cost for downloading the message.

15        7. A method according to claim 5, wherein said charge information comprises a message size and a cost per unit of data transferred.

8. A method according to any one of claims 5 to 7,  
20 wherein said charge information is embedded in a header of said message.

9. A method according to any one of the preceding claims, wherein said data is supplied using said selected  
25 data bearer if said data bearer is accepted.

10. A method according to claim 1, wherein said predetermined bearer selection parameters indicate a subscription type of an end-user, preferences of the  
30 service, and/or preferences of the network operator about bearers.

11. A method according to claim 1 or 10, wherein a change of said selected data bearer is suggested, if said

network information or said predetermined bearer selection parameters change.

12. A method according to any one of the preceding  
5 claims, wherein said data is a multimedia message.

13. A method according to any one of the preceding  
claims, wherein said service is a Web service.

10 14. A network system for supplying data based on a  
service request from an end terminal (1), said network  
system comprising:

a) bearer judging means (1, 10) for judging a data  
bearer to be used for supplying said data; and

15 b) bearer selecting means (10) for establishing a  
connection using said data bearer in response to the  
judging result of said judging means (1, 10), wherein said  
judging means (10) is a network element arranged to acquire  
a network information and to judge said data bearer based  
20 on predetermined bearer selection parameters and said  
acquired network information, and wherein said network  
information indicates a network load on different data  
bearers.

25 15. A network system according to claim 14, wherein  
said bearer selecting means (10) is arranged to select a  
new data bearer and to suggest a change to said new data  
bearer to said end terminal (1).

30 16. A network system according to claim 15, wherein  
said bearer selecting means (10) is arranged to select said  
new data bearer based on terminal capabilities of said end  
terminal (1).

17. A network system according to claim 15 or 16, wherein said bearer selecting means (10) is arranged to suggest said bearer change based on a desired downloading speed and/or coverage restrictions.

5

18. A network system according to any one of claims 14 to 17, wherein said judging means is arranged at said end terminal (1) and adapted to judge said data bearer based on a charge information added to said data .

10

19. A network system according to claim 14, wherein said predetermined bearer selection parameters indicate a subscription type of said end terminal (1), preferences of the service and/or preferences of the network operator about bearers.

15

20. A network system according to claim 14 or 19, wherein said judging means (10) is arranged to suggest a change of said data bearer, if said network information or said predetermined bearer selection parameters change.

20

21. A network system according to claims 14, 19 or 20, wherein said judging means is arranged at a switching center (3) of a cellular network.

25

22. A network system according to any one of claims 14 to 21, wherein said end terminal is a mobile station (1).

23. A network system according to any one of claims 14 to 22, wherein said data bearer is a CSD bearer, a GPRS bearer, a USSD bearer, a SMS bearer, a multimedia bearer, a UDI bearer, or a modem bearer.

30

24. A network element for a network system for supplying data based on a service request to an end terminal (1), said network element comprising:

5 a) bearer evaluating means (101) for evaluating a bearer to be used for supplying said data; and

10 b) bearer selecting means (102) for selecting a new data bearer based on predetermined bearer selection parameters, wherein said bearer evaluating means (101) is arranged to acquire a network information and to evaluate said data bearer based on said predetermined bearer selection parameters and said acquired network information, and wherein said network information indicates a network load on different data bearers.

15 25. A network element according to claim 24, wherein said predetermined bearer selection parameters indicate a subscriber type of an end-user, preferences of the service and/or preferences of the operator about bearers.

20 26. A network element according to claim 24 or 25, wherein said bearer evaluating means (101) is arranged to add a charge information to said data and to initiate a bearer change based on a response received from the end terminal (1).

25

27. A network element according to claim 24, 25 or 26, further comprising a memory (103) for storing said predetermined bearer selection parameters.

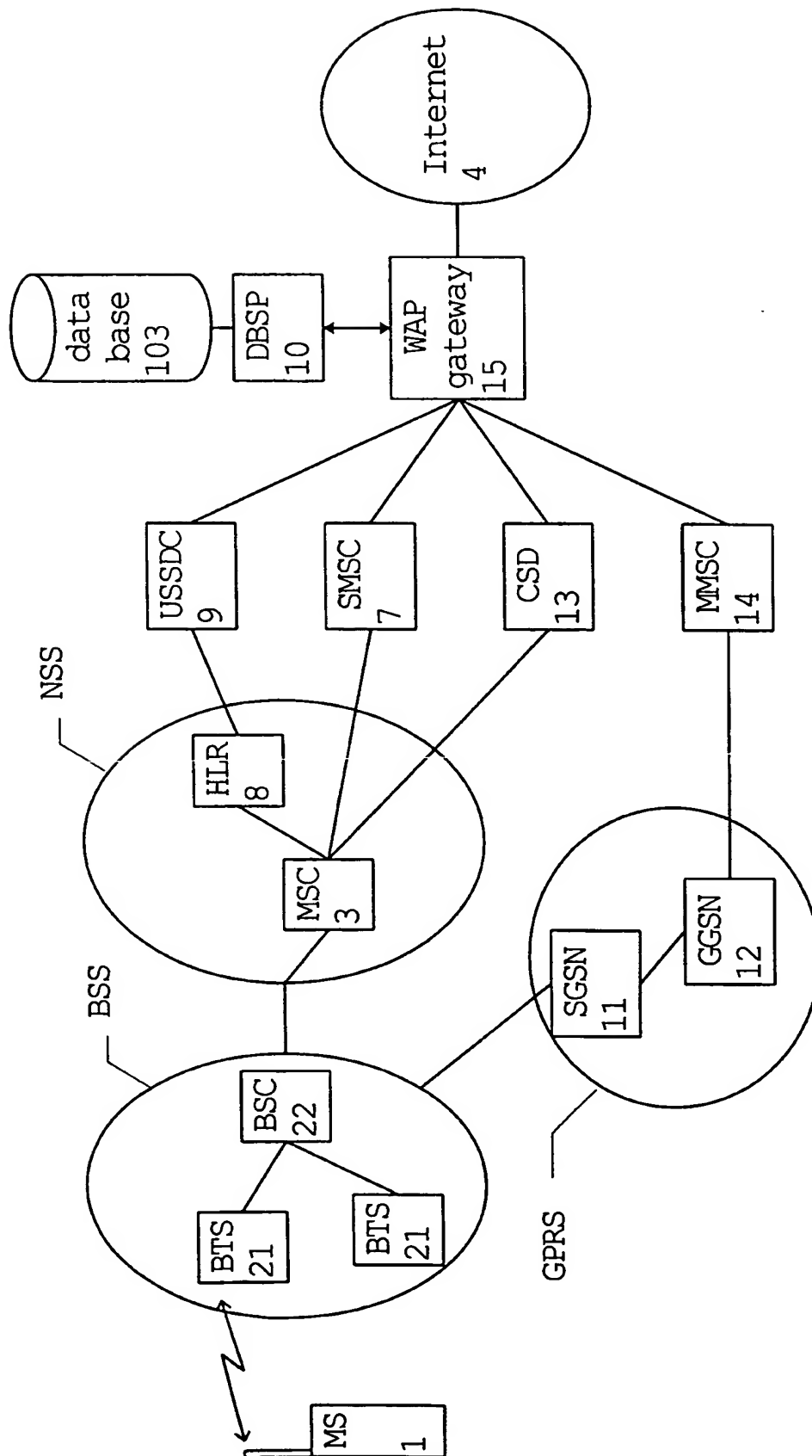
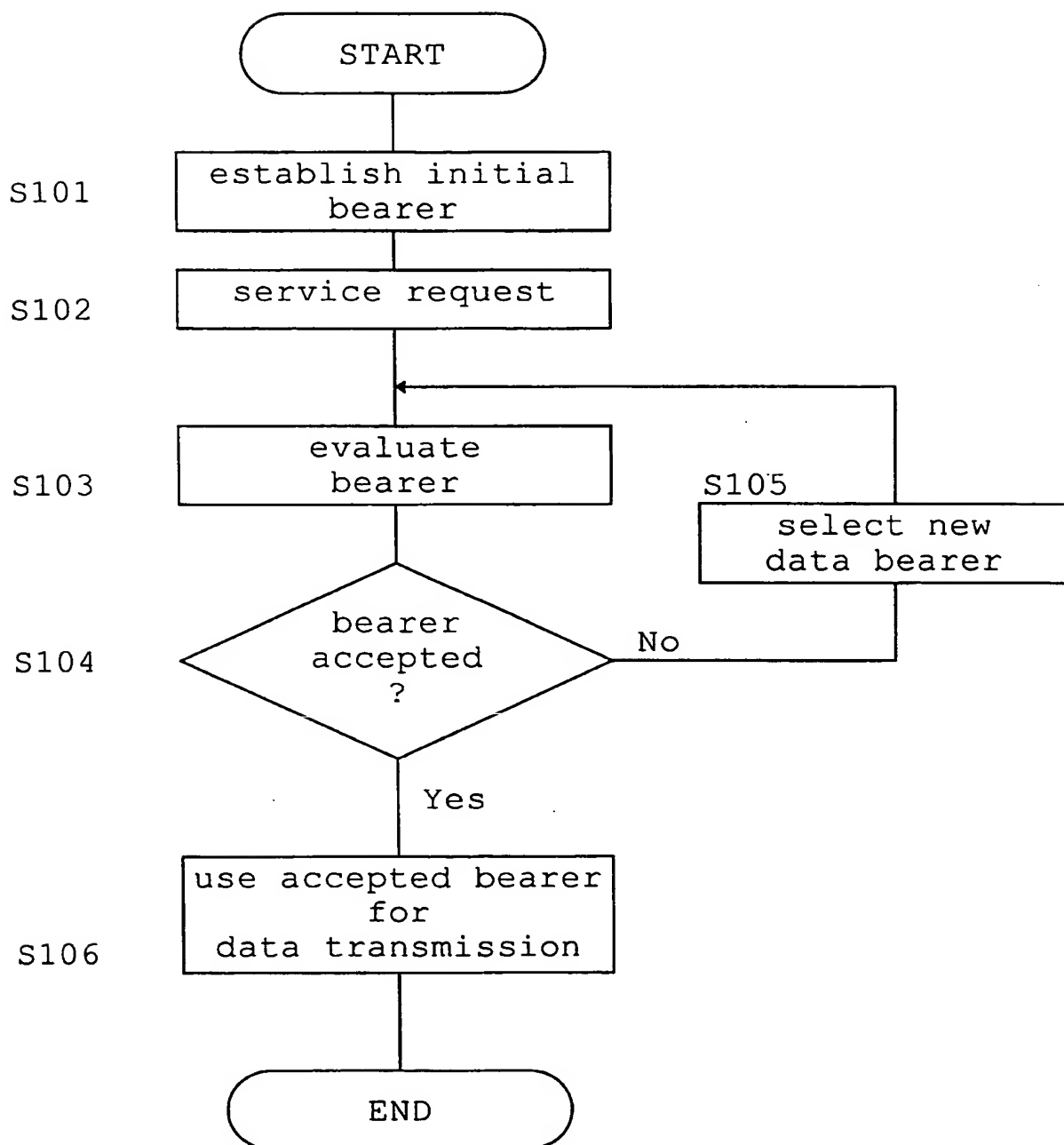
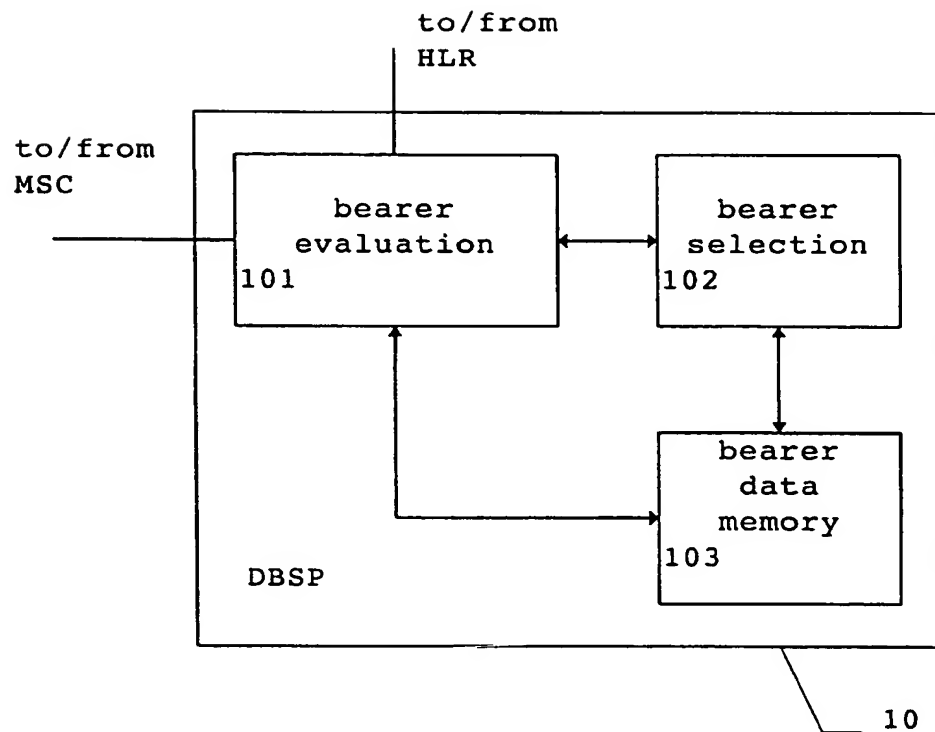


Fig. 1

**Fig. 2**

**Fig. 3**



# INTERNATIONAL SEARCH REPORT

International Classification No.

PCT/EP 99/08565

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04Q7/38

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 818 871 A (TIEDEMANN JR EDWARD G ET AL) 6 October 1998 (1998-10-06)	1-4,9, 10, 12-19, 21, 23-29, 31,33
Y	column 1, line 57 -column 7, line 26 column 8, line 39 - line 49	5-8,20, 30
Y	EP 0 848 560 A (SIEMENS BUSINESS COMMUNICATION SYSTEMS, INC.) 17 June 1998 (1998-06-17) column 4, line 3 -column 5, line 22	5-8,20, 30
A	US 5 923 650 A (LIN YU-CHUAN ET AL) 13 July 1999 (1999-07-13) column 4, line 66 -column 5, line 13	11,22,32

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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19 July 2000

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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